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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/772,528 | 02/04/2004 | Henrique S. Malvar | MCS-070-03 (307216.01) | 5405 |

27662 7590 12/11/2007

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| EXAMINER | |
|---|---|
| LEE, PING | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2615 | |

| MAIL DATE | DELIVERY MODE |
|---|---|
| 12/11/2007 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/772,528 | MALVAR ET AL. | |
| | Examiner | Art Unit | |
| | Ping Lee | 2615 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *28 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-4, 8-11, 15, 16 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedeen (US 5,125,260) in view of Miller, II (hereafter Miller) (US 5,029,215).

Regarding claim 1, Hedeen discloses a system for automatically matching responses in a microphone array (12, 14), comprising:

injecting at least one excitation pulse into each preamplifier in the microphone array;

measuring each output response to each excitation pulse (36, 38);

performing a frequency-domain analysis of the measured output response to each excitation pulse (col. 4, line 49); and

computing frequency-domain compensation gains from the results of the frequency-domain analysis for matching the output of each microphone (col. 4, lines 50-53).

Hedeen discloses the claimed invention with the exception that there is preamplifier coupled to each microphone in the microphone arrays. Although not explicitly shown, some kind of amplifier device should be coupled to the microphones in Hedeen in order to provide signal in proper level to be further processed (by A/D converter, Fourier Transform ... and etc). One skilled in the art would have been

motivated to search any related art for providing such function. Miller teaches the specific layout of having preamplifiers (410, 411) coupled to each microphone. In a similar fashion, the gains of the preamplifiers are adjusted to match the frequency responses between the microphones coupled to preamplifiers in the microphone array. Thus, it would have been obvious to one of ordinary skill in the art to modify Hedeen in view of Miller by utilizing the adjustable preamplifier coupled to each microphone in the microphone arrays in order to adjust the gain after the frequency analysis.

Regarding claim 2, Hedeen as modified in view of Miller teaches that two or more excitation pulses are injected into each preamplifier in the microphone array, and wherein the measured preamplifier output response for each preamplifier is the average response to each excitation pulse (col. 4, lines 58-66 in Hedeen).

Regarding claims 3, 8 and 19, the claimed "computer" reads on a device which performs calculation, the claimed "computer interface" reads on the device on the microphone array coupled the microphone signals to a computer (such as Fourier spectrum analyzer) and the claimed "external computing device" reads on Fourier spectrum analyzer which is external from the microphone array. Another interpretation would be provided below.

Regarding claims 9 and 10, Hedeen fails to show digitizing the output. However, as suggested in Miller, the frequency response analysis could be performed in digital signal using a computer. Thus, it would have been obvious to one of ordinary skill in the art to modify Hedeen by utilizing A/D converter as suggested in Miller in order to perform calculation using a computer or a similar digital computing device.

Regarding claims 11, 3, 4, 8, 15, 16, 18 and 20, Hedeen in view of Miller teaches the external computing device (computer) coupled to a computer interface.

3. Claims 5-7, 12-14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hedeen in view of Miller as applied to claims 1, 3, 9 and 15 above, and further in view of Komninos (US006058076A).

Regarding claims 5-7, 12-14 and 17, Hedeen fails to show the microphone array including at least one memory. Hedeen teaches that the compensation gains would be stored at an external memory device (col. 5, lines 16-18) for further application. This would be inconvenient when the microphone probe and the memory are two separate devices. Komninos teaches to integrate a memory with the microphone probe (col. 18, line 44). The memory could store some predetermined parameters. Thus, it would have been obvious to one of ordinary skill in the art to modify Hedeen and Miller in view of Komninos by integrating a memory with the microphone probe in order to provide convenience when the user moves the microphone probe to different places.

***Response to Arguments***

4. Applicant's arguments filed 9/28/07 have been fully considered but they are not persuasive.

From p. 9-12, applicant argued that Hedeen and Miller fail to show how to match preamplifiers by stating that Hedeen teaches how to match microphones and Miller teaches how to match the frequency response between microphones. This is not persuasive. It is irrelevant that Hedeen and Miller teach more than the limitations

specified in the claimed invention. A microphone is a piece of hardware with its characteristic that is embedded with it. The characteristic can be modified if one takes apart the microphone and redesign the hardware, or the output signal from the microphone could be modified to match the characteristic of other microphone. Hedeen and Miller both teach the latter method. Hedeen teaches how to modify the signal from one or two microphones, so their modified characteristic would be matched. Hedeen does not teach to modify the hardware of the microphone, such as using a new diaphragm. Hedeen teaches to modify the gain and phrase of the signal from the microphone. How to modify the gain and phrase without taking apart the microphone? It was well known to one skilled in the art to adjust the gain and phrase of the preamplifier, amplifier or filter or other functional equivalent device coupled to the microphone. Miller teaches how to adjust gain of the preamplifiers coupled to the microphones to match the performance of the microphones. Although neither Hedeen nor Miller use the exact language as specified in the preamble "matching preamplifier in a microphone array", Hedeen and Miller teaches the end result of the claimed invention, which is to match the output of each preamplifier (see claim 1), with the preamplifier coupled to a microphone. In the specification of the present invention, applicant clearly stated that the present invention determines the gain variations between the two channels (each composed of a microphone coupled to a preamplifier) and provides compensation for it. Hedeen and Miller fulfill this objective. The current invention as claimed does not simply match preamplifier as alleged in the argument (p. 12), the actual function is match output characteristic from the preamplifier coupled to a

microphone. This is exactly what the Hedeen and Miller teach. Applicant seems to imply that two microphones in Hedeen and Miller are matched without having any amplifier or preamplifier coupled to them, and also implied that two preamplifiers without coupled to microphones are being matched. Two microphones, as taught in Hedeen and Miller, cannot be matched in vacuum. They are matched by modifying the amplifier and preamble coupled to them. There is no point of matching the preamplifiers if they are not coupled to microphones. It is clear based on the specification and the body of the claims that the current invention matching the output of a preamplifier coupled to a microphone with another preamplifier coupled to another microphone. This is also clearly taught in Miller.

From p. 13-20, applicant argued that Hedeen and Miller fail to show the claimed invention because Hedeen teaches how to match channel sensitivities and Miller teaches how to match the frequency response. Again, it is irrelevant that Hedeen and Miller teach more than the limitations specified in the claims. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). As discussed before, the claimed invention matching the output of preamp coupled to a microphone with another preamp coupled to anther microphone. Hedeen and Miller teach that.

***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ping Lee whose telephone number is 571-272-7522. The examiner can normally be reached on Monday, Wednesday and Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian C. Chin can be reached on 571-272-7848. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ping Lee
Primary Examiner
Art Unit 2615

pwl